NATURAL RESOURCES CONSERVATION SERVICE

CONSERVATION PRACTICE STANDARD

WASTE STORAGE FACILITY

(No.)

CODE 313

DEFINITION

A waste storage impoundment made by constructing an embankment and/or excavating a pit or dugout, or by fabricating a structure.

PURPOSE

To temporarily store wastes such as manure, wastewater, and contaminated runoff as a storage function component of an agricultural waste management system.

CONDITIONS WHERE PRACTICE APPLIES

- Where the storage facility is a component of a planned agricultural waste management system
- Where temporary storage is needed for organic wastes generated by agricultural production or processing
- Where the storage facility can be constructed, operated and maintained without polluting air or water resources
- Where site conditions are suitable for construction of the facility
- To facilities utilizing embankments with an effective height of 35 feet or less where damage resulting from failure would be limited to damage of farm buildings, agricultural land, or township and country roads.
- To fabricated structures including tanks, stacking facilities, and pond appurtenances.

CRITERIA

General Criteria Applicable to All Waste Storage Facilities.

Laws and Regulations. Waste storage facilities must be planned, designed, and constructed to meet all federal, state, and local laws and regulations. All state and local permits that are applicable for the specific site must be met.

Location. To minimize the potential for contamination of streams, waste storage facilities should be located outside of floodplains. However, if site restrictions require location within a floodplain, they shall be protected from inundation or damage from a 25-year flood event, or larger if required by laws, rules, and regulations. Waste storage facilities shall be located so the potential impacts from breach of embankment, accidental release, and liner failure are minimized; and separation distances are such that prevailing winds and landscape elements such as building arrangement, landforms, and vegetation minimize odors and protect aesthetic values.

Storage Period. The storage period is the maximum length of time anticipated between emptying events. The minimum storage period shall be based on the timing required for environmentally safe waste utilization considering the climate, crops, soil, equipment, and local, state, and federal regulations.

Design Storage Volume. The design storage volume equal to the required storage volume shall consist of the total of the following as appropriate:

(a) Manure, wastewater, and other wastes accumulated during the storage period

(b) Normal precipitation less evaporation on the surface area (at the design storage volume level) of the facility during the storage period

(c) Normal runoff from the facility's drainage area during the storage period

(d) 25-year, 24-hour precipitation on the surface (at the required design storage volume level) of the facility

(e) 25-year, 24-hour runoff from the facility's drainage area

(f) Residual solids after liquids have been removed. A minimum of 6 inches shall be provided for tanks

(g) Additional storage as may be required to meet management goals or regulatory requirements

Inlet. Inlets shall be of any permanent type designed to resist corrosion, plugging, freeze damage and ultraviolet ray deterioration while incorporating erosion protection as necessary.

Emptying Component. Some type of component shall be provided for emptying storage facilities. It may be a facility such as a gate, pipe, dock, wet well, pumping platform, retaining wall, or ramp. Features to protect against erosion, tampering, and accidental release shall be incorporated as necessary.

Accumulated Solids Removal. Provision shall be made for periodic removal of accumulated solids to preserve storage capacity. The anticipated method for doing this must be considered in planning, particularly in determining the configuration of ponds and type of seal, if any.

Safety. Design shall include appropriate safety features to minimize the hazards of the facility. Ramps used to empty liquids shall have a slope of 4 horizontal to 1 vertical or flatter. Those used to empty slurry, semi-solid, or solid waste shall have a slope of 10 horizontal to 1 vertical or flatter unless special traction surfaces are provided. Warning signs, fences, ladders, ropes, bars, rails, and other devices shall be provided, as appropriate, to ensure the safety of humans and livestock. Ventilation and warning signs must be provided for covered waste holding structures, as necessary, to prevent explosion, poisoning, or asphyxiation. Pipelines shall be provided with a water-sealed trap and vent, or similar device, if there is a potential, based on design configuration, for gases to enter buildings or other confined spaces. Ponds and uncovered fabricated structures for liquid or slurry waste with walls less than 5 feet above ground surface shall be fenced and warning signs posted to prevent children and others from using them for other than their intended purpose.

Erosion Protection. Embankments and disturbed areas surrounding the facility shall be treated to control erosion.

Liners. Liners shall meet or exceed the criteria in Pond Sealing or Lining (PS 521).

Additional Criteria for Waste Storage Ponds

Location. A separation distance of 100 feet for storage ponds and waste confinement areas from existing water wells shall be maintained. A different separation distance will require a site specific evaluation of the aquifer. In no case shall a pond be closer to a well than allowed by state and local regulations.

Permits and Regulations. For all waste storage ponds that impound 10 acre-feet or more of wastewater, WAC Chapter 173-175 Dam Safety Regulation, require review and approval of the construction plans and specifications by the Washington Dam Safety Office (Department of Ecology). The plans and specifications are reviewed for conformance with requirements for downstream hazard and dam height classifications; outlet, spillway and energy dissipater configurations; and application of site specific slope stability and design precipitation criteria. These criteria and configurations are listed in “Dam Safety Guidelines: Part IV: Dam Design and Construction, Washington State Department of Ecology, 1993, Document #92-55D.

The impoundment volume is used to determine if a structure exceeds the 10 acre-feet storage threshold. The impoundment volume is the volume of wastewater stored behind the dam from the elevation measured from the lowest

point of the outside limit of the impoundment barrier to the maximum attainable water surface elevation of the reservoir pool that could occur during extreme operating conditions.

For multiple cell waste storage ponds the following shall be considered in the determination of the impoundment volume:

1. Include the volume that would be released from one cell if an embankment were to fail, plus the volume that would drain from adjacent cells through connecting pipe conduits or any other type of spillways that would connect adjacent cells.
2. If the top of the embankments for adjacent cells are not at the same elevation, the breach volume shall include the total volume that would be released from the higher cell plus the total volume that would be released from the lower cell if the common embankment between the cells and the exterior embankment of the lower cell were to both fail.

Soil and foundation.

The pond shall be located in soils with an acceptable permeability that meets all applicable regulation, or the pond shall be lined. Information and guidance on controlling seepage from waste impoundments can be found in the Agricultural Waste Management Field Handbook (AWMFH), Appendix 10D.

Soil permeability rate of the ponds wetted surface shall not exceed $1x10^{-6}$ cm/s. The effects of manure sealing will provide approximately one order of magnitude of additional protection resulting in a liner permeability of $1x\ 10^{-7}$ cm/s. If the foundation permeability rate exceeds $1x10^{-6}$ cm/s, a compacted clay, amended soil liner or synthetic liner is required. Refer to NRCS Conservation Practice Standard 521A-D.

Criteria for Evaluating the Potential of Waste Storage Pond Earthfill Liner Material.

The following appropriate tests must be conducted for compacted earthfill liners, by qualified soils testing laboratory or NRCS soil mechanics laboratory. A number of soil samples may need to be tested if one sample is not representative of the material that is to be used for a Compacted Earthfill liner.

1. ASTM D 420, “Standard Guide to Site Characterization for Engineering, Design, and Construction Purposes Section 8 “Sampling”.
2. ASTM D 2487, “Classification of Soils for Engineering Purposes” shall be followed to classify all samples provided for testing.
3. ASTM D 5084, “Measurement of Hydraulic Conductivity of Saturated Porous Material Using a Flexible Wall Permeameter” shall be conducted on soils or soil admixtures documenting the permeability rate of each sample tested with respect to the moisture/density of the sample.
4. ASTM D 698, “Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures using 5.5-lb Rammer and 12-in Drop” shall be followed.

The data results from the tests listed above shall be used to establish the compaction parameters for construction. NRCS-WA Construction Specification CS-18, Compacted Earthfill Liner, can be used where the specified degree of compaction is to be checked and controlled by standard compaction tests.

Additional Soil and Foundation Criteria

Groundwater and/or seasonal high ground water table. The depth to the seasonal high water table shall be determined. Washington Engineering Technical Note #7 provides guidance on identifying soil features for establishing the seasonal high ground water table depth.

The pond shall have a bottom elevation that is a minimum of 2 feet above the seasonal high water table unless features of special design are incorporated that address buoyant forces, pond seepage rate and non-encroachment of the water table by contaminants. The water table may be lowered by use of passive perimeter drains, if feasible, to meet this requirement.

Foundation and Subsurface Investigations.